

Construction Specification 444—Subsurface Drain

1. Scope

The work consists of furnishing and installing pipe and the necessary fittings and appurtenances as shown on the drawings and as outlined in this specification.

2. Material

Corrugated polyethylene tubing and fittings shall conform to the material requirements of ASTM F405, ASTM F667, AASHTO M252, or AASHTO M294. All corrugated polyethylene tubing shall be heavy duty unless otherwise specified on the plans.

When perforations are specified, the water inlet area shall be a minimum of 1 square inch per lineal foot of pipe. The inlets either shall be circular perforations or slots equally spaced along the length and circumference of the pipe. Unless otherwise specified, circular perforations shall not exceed 3/16 inch in diameter, and slot perforations shall not be more than 1/8 inch wide.

Geotextile filter socks, when required, shall meet the material requirements outlined in the design.

Granular bedding material, when specified, shall conform to the requirements specified in the design.

The pipe shall be appropriately marked with ASTM or AASHTO designation.

3. Handling and storage

Pipe shall be delivered to the job site and handled by means that provide adequate support to the pipe and do not subject it to undue stresses or damage. When handling and placing corrugated polyethylene pipe, care shall be taken to prevent impact blows, abrasion damage, and gouging or cutting (by metal edges and/or surface or rocks). The manufacturer's special handling requirements shall be strictly observed. Special care shall be taken to avoid impact when the pipe must be handled at a temperature of 40 degrees Fahrenheit or less.

Pipe shall be stored on a relatively flat surface so that the full length of the pipe is evenly supported. Unless the pipe is specifically manufactured to withstand exposure to ultraviolet radiation, it shall be covered with an opaque material when stored outdoors for 15 days or longer.

4. Excavation

Unless otherwise specified or approved by the engineer, excavation for and subsequent installation of each tube pipeline shall begin at the outlet end and progress up grade. The trench or excavation for the pipe shall be constructed to the lines, depths, cross sections, and grade shown on the drawings, or as approved by the engineer.

Trench shields, shoring and bracing, or other suitable methods necessary to safeguard the contractor's employees and the works of improvement and to prevent damage to the existing improvements shall be furnished, placed, and subsequently removed by the contractor.

5. Preparing the pipe bed and blinding the pipe

When a granular filter or envelope is specified, the filter or envelope material shall be placed in the bottom of the trench just before the pipe is laid. The pipe shall then be laid and the filter and envelope material placed to a depth over the top of the pipe of not less than that shown on the drawings.

When a granular filter or envelope is not specified, the bottom of the trench shall be shaped to form a semicircular or trapezoidal groove in its center. This groove shall provide support for not less than a fourth of the outside circumference of the pipe. After the pipe is placed in the excavated groove, it shall be capped with friable material from the sides of the trench. The friable material shall be placed around the pipe, completely filling the trench to a depth of at least 3 inches over the top of the pipe. For material to be suitable, it must not contain hard clods, rocks, frozen soil, or fine material that will cause a silting hazard to the drain. Pipe placed during any day shall be blinded (place required soil material around and over pipe) and temporarily capped before construction activities are completed for that day.

6. Placement and joint connections

All pipes shall be installed to grade as shown on the drawings. After the pipe is placed in the trench and blinded, allow sufficient time for the pipe to adapt to the soil temperature before backfilling.

Maximum allowable stretch of the pipe is 5 percent. Special precautions must be implemented on hot, bright days to ensure that the stretch limit is not exceeded and excessive deflection does not occur as a result of installation procedures, including backfill operations.

Unless otherwise specified on the drawings, connections are made with manufactured junctions comparable in strength with the specified pipe. All split fittings shall be securely fastened with nylon cord or plastic zip ties before any backfill is placed. All buried ends shall be supplied with end caps unless otherwise approved by the engineer.

7. Backfilling

The backfilling of the trench shall be as shown on the drawings and completed as rapidly as is consistent with the soil conditions. Automatic backfilling machines may be used only when approved by the engineer. Backfill shall extend above the ground surface and be well rounded and centered over the trench.